



EDUCATION AND CULTURE

# LEONARDO DA VINCI

Second phase:2000-2006

## Project: Megatrends in E-learning Provision

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### Survey for case studies in the Megatrends project Universidad Politécnica de Madrid

#### Facts about the institution

Name of institution	Polytechnic University of Madrid (Universidad Politécnica de Madrid - UPM)
URL of institution	<a href="http://www.upm.es">www.upm.es</a>
Country	Spain
Levels in the education system	Higher education level
Interviewer	Pedro Fernández Michels
Interviewees	- Raquel Portaencasa, Head of the <i>Gabinete de Tele-Educación</i> (distance education cabinet) <a href="http://www.gate.upm.es">www.gate.upm.es</a> Tel.: +34 91 336.61.58 <a href="mailto:raquel.portaencasa@upm.es">raquel.portaencasa@upm.es</a> - Juan Vidal Conde, Project Coordinator in GATE. <a href="mailto:juanvidal.conde@upm.es">juanvidal.conde@upm.es</a> Tel.: +34 91 336 61 57

The UPM is a public university located in the capital of Spain. The majority of its centres is over hundreds of years old. They were founded in the 18th and 19th centuries. Each of them maintained its independence until being grouped together to form the UPM in 1971. The institution agglutinates a large number of technical studies as for example architecture, aeronautics, engineering, mining, naval engineering, telecommunication, computer sciences and others. Being a public university, UPM operates on a non-profit basis and is integrated in the Spanish higher education system.

The interview focuses on GATE (Gabinete de Tele-Educación), a department attached to the Vice Presidency of New Technologies and Web Based Services (Vicerrectorado de Nuevas Tecnologías y Servicios en Red). The main functions of GATE are:

- a) To provide support to teachers that wish to integrate ICT in their teaching processes



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- b) To develop the university's virtual campus in collaboration with the service for computer science
- c) To collaborate in different projects and initiatives related to distance education
- d) To develop online courses for graduate students (optional courses), continuing training courses and training courses for the university's teaching and administrative personnel.

The courses are carried out by using four main technologies, which are:

- Videoconferencing
- Video streaming
- Internet
- Videoconferencing IP and Internet in real time.

The VLE environment used to deliver e-learning is MOODLE.

In the year 2005, 110 different courses were provided and there were 14.000 course enrolments.

## **Contextual factors**

### **Market size**

The UPM is a well known institution in the fields of technical studies.

Therefore it not only focuses on the wider area of Madrid but also on the whole country. The total population of Spain is 40 million. Spanish is the common language in all 17 autonomous regions of which three have an own language which has official status within the region.

There currently exist 70 universities in Spain, 48 of which are public. The total number of registered students in Spanish universities for the academic year 2004/05 was 1.535.626.

### **Market readiness to use online technologies**

ICTs have not yet reached a satisfactory degree of diffusion in Spain, despite recent progress. Internet penetration among households is low compared to the other EU members. One important reason are the high prices for Internet connections. Broadband diffusion, however, has been comparatively fast in the last three years, in particular in the more developed and urban parts of the country such as Catalonia.

The country has a low score on the Digital Divide Index, which means that disparities in access to and use of the Internet between sub-segments of the population (genders, age groups, socio-economic groups) are considerably bigger in Spain than in most of the EU25.

### **Target group acceptance of e-learning**

The acceptance of e-learning within university students can be considered relatively high. In spite of the lack of diffusion of ICTs and the disparities



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mentioned in the paragraph above, the large number of e-learning initiatives in Spanish universities indicate a satisfactory level of acceptance of the use of ICT in teaching and learning among the academic community.

### **Digital literacy in population**

It can be assumed that digital literacy in the target group is relatively high. Spanish university students and teachers use computers and the Internet on a regular basis. However the percentage of the total number of Spanish people aged 16 to 74 that do not use the computer or the Internet is slightly higher than the same figure for the UE-25.<sup>1</sup>

### **National policy**

Neither the central government nor the regional administrations are carrying out a specific policy in order to promoting e-learning. The projects that are being undertaken are more generic and only have an indirect effect on the development of e-learning.

“Following the e-learning initiative launched by the European Union in 2000, the Spanish government has developed a set of policies and initiatives to promote eLearning. The main points of this policy are:

- providing all schools with the equipment and facilities for accessing ICT;
- developing Internet courses and training;
- setting up an observatory and laboratory concerned with the educational applications of ICT, thereby supporting innovation and development in such applications;
- strengthening cooperation between Latin America and Europe in the area of ICT in education.

Moreover, several plans and projects are dedicated to eLearning for vocational purposes. These are supported by the Spanish Government through the European Social Fund, and through FORCEM (Continuing Training Foundation). It is indicative of the situation that 30% of all training plans presented in 2002 were related to eLearning. Moreover, the Ministry of Industry Tourism and Commerce has created FORINTEL, a program to promote the use of ICTs in enterprises, which offers eLearning courses. Currently, the Spanish government has launched the Plan España.es for the period 2004-05.

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<sup>1</sup> DEMUNTER, Christophe (2006): “How skilled are Europeans in using computers and the Internet?” [Online article]. In: *Statistics on focus. Industry, trade and services 17/2006*. (Data retrieved on 30/10/2006). URL: [http://epp.eurostat.ec.europa.eu/cache/ITY\\_OFFPUB/KS-NP-06-017/EN/KS-NP-06-017-EN.PDF](http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-NP-06-017/EN/KS-NP-06-017-EN.PDF)



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One of the action points of the Plan is the promotion of accessibility to training and digital content."<sup>2</sup>

### **Historical context**

#### **1. How would you describe the history of distance education in your institution?**

The Universidad Politécnica de Madrid was established as a public university in 1971 but its origins are much older. In fact, it is the result of a merging process which brought together several different technical schools and science institutes in Madrid, as for example the Schools of Architecture and Engineering or the Royal Academy of Mathematics.

The GATE (Gabinete de Tele-Educación) was created in 1991 in order to integrate ICT in the UPM's educational program. The main activities of the cabinet are to coordinate the e-learning courses offered in the university and to give support and training to teachers and staff that wish to provide online teaching to their students. This training includes technical as well as pedagogical aspects.

#### **2. How has competence in e-learning developed in your institution and how has it contributed to your success?**

The competence in e-learning has basically developed by carrying out experimental projects, mainly initiated on an individual basis, that are analyzed, evaluated and conceptualized by the GATE in order to make them extensible for general use. For this purpose, the GATE has a special team dedicated to the exploration of possibilities of e-learning. It also considers and analyzes every initiative that comes from other vice presidencies. In that sense, the development of e-learning competence relies up to a considerable extend on individual initiatives that are gathered by the cabinet in order to turn them into feasible projects applicable to the institution's educative program. It possibly is the bottom-up approach that has contributed to the success of the university's e-learning activity so far. Thanks to this approach new projects were more likely to cover real needs.

#### **3. Has this development been abrupt or would you describe it more as a gradual step-by-step process)?**

E-learning has developed slowly. Being rather a bottom-up than a top-down process, the creation and integration of online courses for graduate students

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<sup>2</sup> [www.euser-eu.org](http://www.euser-eu.org)



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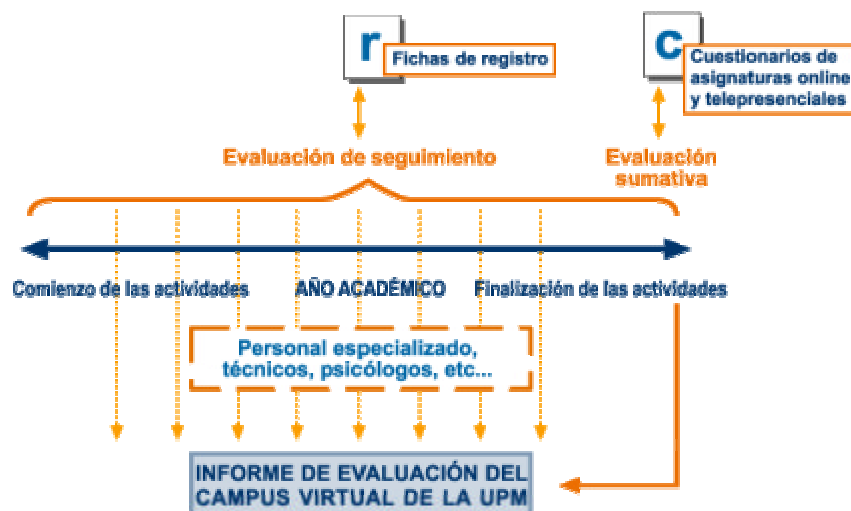
has been a slow process where the teacher has the initiative to do the first step towards the digitalization of his course. Once the teacher applies for the

process of creating an online course the decision about whether it is going to be carried out or not is taken in the respective centre or faculty.

Decisions about the production of online-courses in the area of staff training and postgraduate programmes are taken by the staff training council (mesa de formación) and the commission for postgraduate studies (commission de posgrado), respectively. Every single initiative is analyzed and evaluated in order to decide the feasibility within the institution's structure

### 4. How has online education been followed up by evaluation and research and how has this contributed to your success?

Evaluation has always been a key instrument in the implementation and application process of e-learning projects and courses. Online teaching, tutoring and support activities as well as technical issues have been subject to thorough evaluation since GATE has been created. Particularly the teaching processes are evaluated continuously with the help of questionnaires for teachers and students and employing observers that follow the course activities and check the resources, the contents and the learning activities "in situ". Obviously the learning process of each student is also subject to evaluation. The results of these evaluation routines are summarized in a report at the end of the term and handed out to the teachers so that they can work on it as a basis document that indicates possible needs of improvement. The evaluation activity as a whole has generated and is based on a book of good practice.





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The illustration shows the evaluation process GATE applies to the online teaching process.

In addition to the evaluation processes, GATE runs a technological observatory that carries out research on pedagogical and technical issues in the e-learning context. The observatory is an important instrument to keep the institution up to date. One interesting example is the evaluation of a large number of e-learning platforms undertaken by the GATE and the Department of Electronic systems and Control (SEC). The project's results played a substantial role in the decision of choosing MOODLE as the university's VLE.

### **Technical issues**

#### **5. How would you describe competence in information and communication technology in your institution?**

The competence in information and communication technology has grown with time. Obviously, in the beginning, skills and knowledge were at a minimum. The creation of the GATE as a canalizing factor has certainly contributed to a reasonable and at the same time effective increase of competence among teachers and technicians.

#### **6. To which extent are e-learning courses in your institution based on widely used technologies that can be taken into use by students without requiring them to buy additional hardware or software? (in addition to what they have from before)**

The e-learning courses at UPM are always based on widely used technology in order to make sure that every student can access and run the courses without any special skills, hardware or software. The only thing necessary to be able to follow a UPM online course is a computer with a standard configuration and an Internet connection. This form of accessibility is considered a key issue for success.

#### **7. How would you describe the integration between different IT-systems that are involved in e-learning in your institution? How has this contributed to your success?**

All e-learning activity that happens in and around GATE is based on MOODLE as the institutional VLE running in the institution. Although it is true that there are some own developments in the field of learning management systems within the university as a whole, like AulaWeb and ARFO, in the specific context of the distance learning cabinet it is certainly an advantage



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not having to deal with several different systems and the need to integrate them under a common purpose. The GATE decided to use MOODLE, because it

is a very comprehensive platform regarding the numerous resources it offers and after having analyzed the results of the mentioned evaluation of e-learning platforms. It was considered important not to depend on the services of a commercial provider and to be able to introduce as many changes as necessary in the original configuration or code of the application in order to adapt it to the institution's needs and requirements. Another factor worth to mention is to see that there is an important academic community that uses and improves MOODLE constantly.

### **8. What are the strengths and weaknesses of your e-learning administrative systems (from enrolment through delivery to certification)?**

The administrative system, and here we're mainly talking about enrolments and registrations, runs with ORACLE. The integration of both systems, MOODLE and ORACLE, is not always easy and it was necessary to develop intermediate applications in order to ensure a correct communication between the two systems. However, this has never been a fundamental problem, apart from the increased workload for technicians.

The main strengths are

- the successful running of the courses
- the efficient quality evaluation system
- the production of contents and resources
- the implementation of e-learning in general

The main weaknesses are

- the need to carry out enrolments and registrations with a second system (ORACLE)
- the certification process is complicated, particularly in continuing training courses.

## **Courses**

### **9. Which types of subjects are covered by online education in your institution and what is the relative importance of different subjects?**

All subjects related to engineering and architecture.

### **10. How would you describe the "onlineability" of the subjects your institution has chosen for e-learning?**



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On the technical side there are certainly some tools related to the virtual laboratory that are relatively difficult to design and create.

Apart from that, our online courses are characterized by an intensive use of virtual communication and collaboration tools, such as forums, WIKIS etc. It is sometimes difficult to find topics or problems that are open enough to be discussed and debated on. The very technical character of the subjects generates declarative and conceptual knowledge that is very little susceptible to debating and negotiating. However, the course design takes this difficulty into account and offers many complex learning activities like case studies and problem based learning in order to make a collaborative approach easier to be carried out.

### **11. Do the online courses provided by your institution have flexible start-up and progression?**

There is no flexible start-up and progression. A determined and structured time organization is considered a valuable help for the students in their task of managing their online learning experience.

### **12. What is the role or importance of synchronous and asynchronous communication between students and teachers and among students themselves?**

The intensive use of communication tools in online learning is considered a key factor for success. Communication and collaboration creates a group consciousness and supports a meaningful and efficient learning process. The UPM doesn't understand e-learning as a form of ICT-based content provision. A very social example for a successful use of online communication in order to create a positive atmosphere in the virtual environment is a quiz that is set every Friday at 14 h in the courses for the administrative personnel. The first student to submit the correct answer can win prizes like a webcam, a pen-drive etc. The example shows that not only the academic aspects of online activity are taken into account, but also the social perspective of togetherness in virtual environments, which can be an important and even decisive basis for a good teaching and learning performance.



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### **Management, strategy and attitudes**

**13. How would you describe involvement from the institution leadership in terms of being supportive, and how has this been important for success?**

The unconditional support of the presidency of the university has certainly been decisive when it came to providing means, approve initiatives, create spaces and canalize projects towards the GATE.

**14. How would you describe the attitudes of the different groups of staff towards online teaching? How has this affected your success?**

The attitude of the staff has changed from an initial scepticism to a considerable amount of interest and proactive approaches. Apart from the increased familiarity with e-learning and its related issues, the reformation of the university's study plans according to the Bologna process has certainly contributed to a higher degree of consciousness and acceptance of online approaches as valid tools to achieve the necessary changes in our system.

**15. Does your institution have a strategy for online education? If yes, what is (briefly) the content of the strategy and how is it followed up by employees in your organisation?**

The strategy followed by the institution so far can be characterized as a mediated bottom-up approach in which the first initiative rests with the individual employee up to a considerable extend. The GATE's function is to promote these initiatives, analyze and evaluate them and implement them in a form that allows it to make them extensible to other areas of the institution. One very important part of this strategy is the evaluation protocol mentioned before. The strategy is followed up in a very positive way. The staff shows a remarkable degree of enthusiasm.

**16. How does your institution deal with quality issues related to online education and has quality contributed to success?**

Quality is certainly a key factor for success. The UPM takes quality issues very seriously and the GATE has a whole unit dedicated exclusively to quality. The aim is to achieve a progressive improvement of all aspects of e-learning through constant evaluation before, during and after the process or



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experience. There are mechanisms and institutions for internal and external evaluation.

### **17. How would you describe the effectiveness of your administrative routines in online education?**

The effectiveness of our administrative routines can be described as satisfactory. They have been developed by the institution itself which certainly guarantees a high degree of adjustment to the needs of the institution.

### **18. To which extent do teachers involved in online education have predictable and manageable workloads?**

It is a fact that the workload of a teacher increases considerably by taking responsibility in an online course. This workload also depends on the commitment of the teacher, meaning that a teacher who is honestly concerned with the learning processes and the quality of the learning activities of his student certainly spends more time and effort on a course than another one who gets less involved. It is also true that a highly increased workload very easily leads to low quality teaching performance. To avoid that it is very important to take this issue into account already at the design stage. The possible workload has to be foreseen and, if possible, limited to a minimum. This obviously goes against the collaborative and communicative approach described earlier on, but the question is to find a reasonable balance between both aspects.

Every teacher that is interested in designing an online course receives an 80 hour training package in order to help him to take correct decisions and prevent him from designing learning experiences that might not be feasible due to the big amount of work they would generate.

### **19. To which extent does your institution collaborate with other educational institutions and how has this affected success?**

The collaboration with other educational institutions is frequent, fluid and certainly positive under the aspect of mutual enrichment. Collaboration, benchmarking, exchange of ideas, sharing training, courses and experiences (for example with universities in Latin America) has affected our success in a positive way.

### **20. How would you describe the credibility of your institution (both formal and informal) with the government and public administration and how has this been an important criterion for success?**



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Being a public university, the credibility of the UPM with the government and the public administration is total.

### **21. How are you able to handle the large number of online courses and students?**

The key factors are:

- personal enthusiasm
- a multidisciplinary team
- robust technology and competent technicians
- support from the institution's leadership

## **Economy**

### **22. How would you describe the cost-effectiveness of online education in your institution? How has cost-effectiveness affected success?**

Being a public university the UPM has to be considered a service that is not subject to economic parameters. However, the cost-effectiveness in the area of continuing training is certainly satisfactory.

### **23. To which extent is income from operation of online education stable and predictable?**

Income is neither stable nor predictable due to the fluctuation of the number of registered students.

### **24. To which extent does your institution experience pressure to be flexible to be able to adapt to a changing market?**

Unless there is no pressure that could be mentioned, the institution keeps a high degree of flexibility on the technical side in order to guarantee an ongoing validity of the created courses and resources. This is mainly undertaken by following the main standards that operate in the field of e-learning.

### **25. To which extent does your institution apply a strategy of flexible employment and use staff to adapt to changes in markets?**

Flexible employment is necessary in a field that does not allow exact prediction on volume and needs. The UPM keeps a flexible pool of part-time employees that can be activated according to the upcoming needs. Some of these needs are covered by trainees.



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